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SOUTHERN FOREST EXPERIMENT STATION

E. L. Demmon, Director

New Orleans, La.



SAWTIMBER AND CORDWOOD VOLUMES IN CENTRAL AND SOUTHWESTERN MISSISSIPPI

A Progress Report

By

THE SOUTHERN FOREST SURVEY

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* - This is an advance release of Forest Survey data that will be included in complete reports to be published later. This information is subject to correction or amplification as computations proceed.

FOREWORD

The nation-wide Forest Survey, being made by the United States Forest Service, was authorized by the McSweeney-McNary Forest Research Act of 1928. Its five-fold object is: (1) to make an inventory of the present supply of timber and other forest products, (2) to ascertain the rate at which this supply is being increased through growth, (3) to determine the rate at which this supply is being diminished through industrial and local use, windfall, fire, and disease, (4) to determine the present requirement and the probable future trend in the requirement for timber and other forest products, and (5) to correlate these findings with existing and anticipated economic conditions, in order that policies can be formulated for the effective use of land suitable for forest production.

In the South, the Forest Survey functions as an activity of the Southern Forest Experiment Station with headquarters at New Orleans, La.

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SAWTIMBER AND CORDWOOD VOLUMES IN CENTRAL AND SOUTHWESTERN MISSISSIPPI

This report deals with that portion of central and southwestern Mississippi lying east of the Mississippi River and the Yazoo Delta. Including all or parts of the 28 counties shown on the accompanying map, this Survey Unit contains a land area of 10,799,500 acres, of which 56 percent is occupied by some stage of forest growth. Except for a rather extensive upland hardwood area in the western part of the unit, the principal tree species are short-leaf and loblolly pine, with an admixture of hardwoods. Stream margins and bottomlands are dominated by hardwoods, with loblolly and spruce pine occasionally admixed. The terrain ranges from gently rolling to rough, with small "mountains" in the vicinity of Meridian. The principal drainage is southward to the Gulf through the Mississippi, Pearl, Pascagoula, and Tombigbee Rivers or their tributaries.

The area is served by the lines of five major railroads: the Illinois-Central; the Gulf, Mobile & Northern; the Southern; the Mississippi Central; and the Gulf & Ship Island, as well as by several smaller railroads that serve parts of the unit. Jackson, Meridian, and Vicksburg are the principal cities. Jackson is about 740 miles by rail from Chicago and 1240 miles by rail from New York City. About 450 miles of paved highways, and a good system of improved country roads facilitate travel in all parts of the area, although during rainy weather a few of the minor country roads are difficult to travel. The recently inaugurated industrial development plan for the State includes a highway program that will result in a marked increase in the paved mileage.

Water transportation also is available. Natchez and Vicksburg on the Mississippi River are the chief ports in the region, while Gulfport and Mobile on the Gulf serve as coastal shipping points.

There is in this unit a large natural gas field in the vicinity of Jackson. Coal can be procured by rail from the Birmingham, Alabama, section; and oil, sulphur, and salt can be obtained from Louisiana.

Land Area

About 56% of the land surface of this unit is in some stage of forest growth, and the remaining 44% is in agricultural use, although about 30% of this was out of cultivation in 1934 (table 1). Cotton, of course, is the principal field crop.

Like other localities in the South, this unit includes a large area of land now bearing forest growth and well adapted to the continuous production of timber. To produce continuously timber in large quantity and of good quality there must be present at all times a large volume of vigorously growing standing timber or "growing stock". Forest owners and communities desiring continuous operations of sawmills and other wood-using plants must provide for the permanent maintenance of this growing stock by means of fire protection and conservative cutting practices. The forest land areas and timber volumes shown in the following tables constitute the capital investment indispensable for timber production.

Table 1. -- Land area classified according to use

Land-use	Acres	Percent of total area
Forest:		
Productive	6,026,400	55.8
Nonproductive	<u>3,900</u>	<u>negl.</u>
Total forest	6,030,300	55.8
Agricultural:		
In cultivation:		
Old cropland <u>1/</u>	3,076,600	28.5
New cropland <u>2/</u>	119,900	1.1
Out of cultivation:		
Idle <u>3/</u>	414,800	3.8
Abandoned <u>4/</u>	354,900	3.3
Improved pasture	<u>615,600</u>	<u>5.7</u>
Total agricultural	4,581,800	42.4
Others: <u>5/</u>	187,400	1.8
Total area	10,799,500	100.0

1/ Land cultivated more than 5 years and on which a farm crop was raised within 2 years prior to the date of survey.

2/ Land converted from forest to cropland within 5 years prior to date of survey.

3/ Cultivated land that has been idle for 2 years or more, but has not reached the abandoned stage.

4/ Land once cultivated but showing distinct evidence of having been abandoned; no attempt has been made to maintain it as improved pasture.

5/ Highways, waterways, railroads, towns and villages, etc.

Forest Area

Most of the forest area (about 80 percent) is in rolling uplands, while the remainder is distributed among swamps and stream bottoms. In table 2, the forest area is classified according to forest condition and type-group. The forest type-groups are designated by the commercial species that predominate in the stands.

Table 2. -- Forest area classified according to forest condition and type-group

Forest condition ^{1/}	Forest type-groups designated by dominant species			Total forest area	Percent of total forest area
	Pine	Pine- hardwood	Hardwood		
----- Acres ^{2/} -----					
Old growth:					
Uncut	80,200	31,100	164,200	275,500	4.6
Partly cut	70,800	67,700	348,700	487,200	8.1
Total	151,000	98,800	512,900	762,700	12.7
Second growth:					
Sawlog size:					
Uncut	938,600	351,000	514,500	1,804,100	29.9
Partly cut	432,700	277,900	368,100	1,078,700	17.9
Under-sawlog size:					
Uncut	746,400	524,500	607,900	1,878,800	31.2
Partly cut	72,400	78,600	56,800	207,800	3.4
Total	2,190,100	1,232,000	1,547,300	4,969,400	82.4
Clear-cut and reproduction	193,800	49,900	50,600	294,300	4.9
Total forest area	2,534,900	1,380,700	2,110,800	6,026,400	100.0
Percent of total forest area	42.1	22.9	35.0	100.0	

^{1/} Definitions of the various forest conditions are found in the previous releases of the Survey.

^{2/} Since classifications totaling less than 60,000 acres may have a relatively large error, they should be considered as indicating only the comparative magnitude of the item.

The shortleaf, loblolly, and longleaf pine types are the principal pine associations. Shortleaf and loblolly occur commonly in pure and mixed stands throughout the unit; while the commercial range of longleaf pine extends a short distance into the unit from the south, it occurs only in small scattered bodies and does not dominate a sufficient area to be shown on the accompanying map of major forest types. The hardwood area is about equally divided between the upland and bottomland types. Upland hardwoods dominate the rough, loessal country bordering the Delta, reaching east to Jackson and north to Lexington. The bottomland hardwoods are found along the Big Black and Pearl Rivers, and as narrow strips bordering the smaller streams throughout the unit. A small portion of the famous Black Prairie of Alabama and Mississippi, a comparatively treeless region used mainly for farming, occu-

pies the eastern half of Noxubee County and a corner of Kemper. As will be seen from the table, over four-fifths of the forest area is in second-growth stands, and only a third of the small amount of old growth that remains is still uncut. It will also be noted that pine types make up over 40 percent of the total forest area. On nearly 67,000 acres the forest stand was entirely removed, and restocking has not yet taken place.

Board-foot Volume

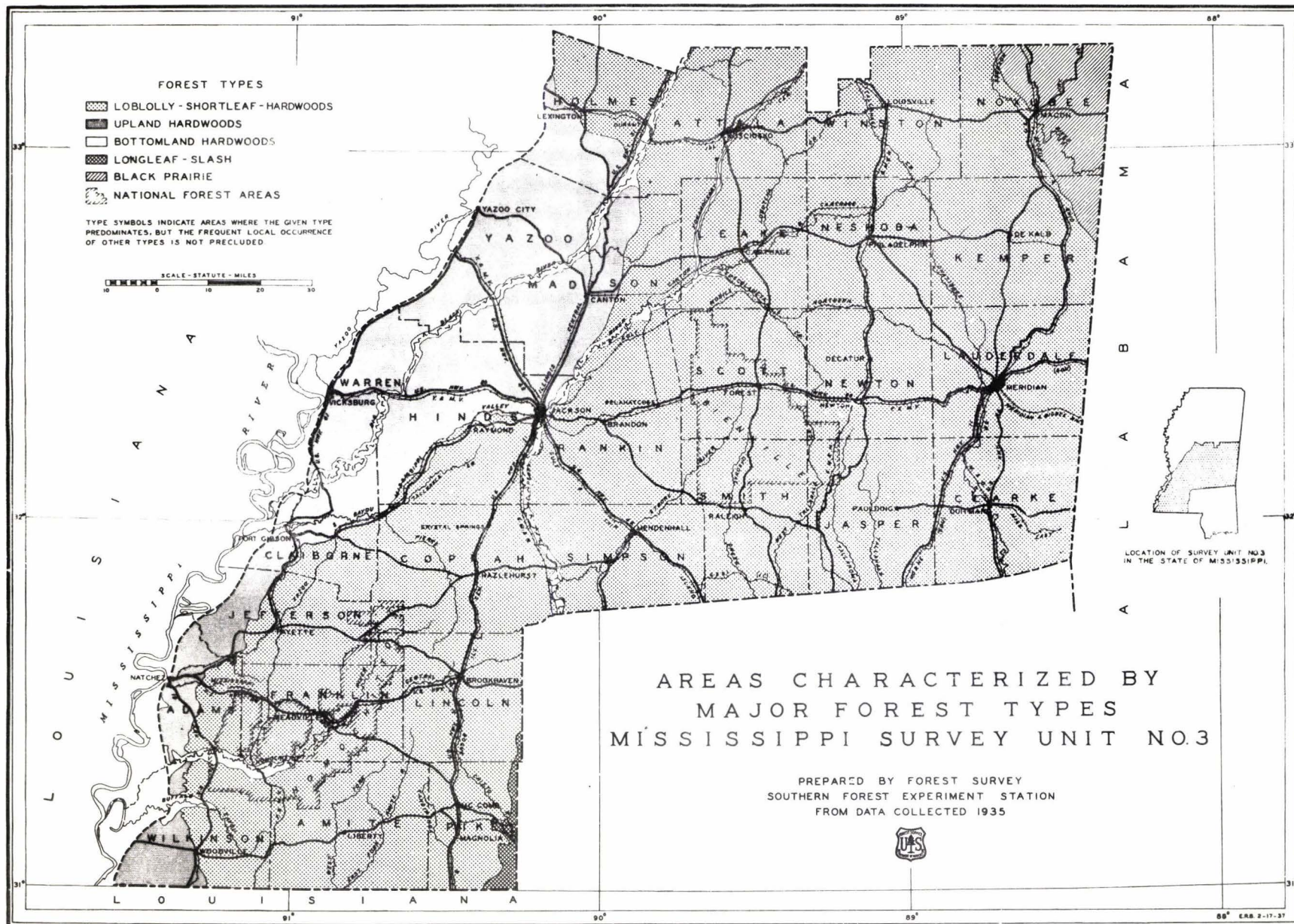
In the estimate given in table 3 the stand of sawtimber trees is expressed in terms of board feet as measured by the Doyle log-rule. The volumes are net log scale, that is, allowance has been made for material that would be left in the woods because of rot, fire-scar, crook, limbiness, and similar defects; and allowance has also made for mill cull, i.e., sweep and interior defect. Sawtimber trees are here defined as trees that contain at least one usable 12-foot log and that will yield at least 50 percent of the gross volume in sound material; in the case of hardwoods, the minimum breast-height diameter outside bark is 13 inches, and in pines, 9 inches.

Table 3. -- Net sawtimber volume (Doyle scale) classified according to species-group and forest condition

Species-group	Forest condition		Total
	Old growth	Second growth	
----- Thousand feet, board measure <u>1</u> / -----			
Longleaf pine	225,500	59,300	284,800
Loblolly and shortleaf pine	1,187,600	4,718,900	5,906,500
Gum, cottonwood, magnolia, maple, etc.	808,400	1,435,400	2,243,800
Oak, beech, hickory elm, etc.	1,298,300	1,690,100	2,988,400
Total	3,519,800	7,903,700	11,423,500

1/ Classifications totaling less than 100,000 M board feet may have a relatively large error and should be considered as indicating only the comparative magnitude of the item.

The sawtimber stand of the unit totals nearly $11\frac{1}{2}$ billion board feet (Doyle), of which less than a third is in the old-growth condition. Only in the case of the longleaf pine is there more volume in old growth than in second-growth. Such old-growth stands of longleaf pine as exist are in small scattered bodies along the southern boundary of the region. A few fairly large bodies of old-growth shortleaf pine were found in the northern part of the region. Stands of sawlog-size second-growth shortleaf and loblolly pine were found throughout the region and are particularly well represented in the



southwestern portion. The greatest volume of high-quality hardwood is located in the bottomlands of the Pearl, the Big Black, and the Chickasawhay Rivers. The highest quality of the upland hardwoods volume in the unit is in the 5- to 10-mile strip of broken country in the "Bluffs" that border the Delta along the western boundary of the region.

As can be inferred readily from the variety of tree species and tree sizes, there is great variation in the quality of the standing timber. This permits application of selective-cutting practices designed to utilize at an early date those portions of the stands that are mature or otherwise in need of removal. At the same time, care in selecting the trees to remain standing for further growth will improve the future output of these forests both in quality and quantity.

Cordwood Volume

In estimating the cordwood volume, the entire stand of good trees 5 inches or over in diameter, outside the bark at breast height, is expressed in terms of standard (4 x 4 x 8 feet) cords. Sawtimber trees, which are covered in the estimate of board-foot volume, are also included in this estimate. In under-sawlog-size trees of all species and in sawlog-size pines, the stem is included up to a variable top-diameter, with 4 inches as a minimum; while in sawlog-size hardwoods and cypress only the sawtimber portion is included. The volume in sound and rotten cull trees is not included. Deduction from the volume of good trees is made for woods cull, that is, that part of the tree that would be left in the woods because of rot, fire-scar, crook, bad knots, or other defects; this deduction is approximately 4 percent, and might have been offset by the sound cull trees that are usable for cordwood if they had been included in the estimate.

In table 4 the cordwood volume is classified according to pulping and nonpulping species-groups, and according to the size of the trees from which it is obtained. Practically all of the pine volume consists of loblolly and shortleaf pine; about half of this is in trees less than 13 inches in diameter. The pulping hardwood species include red gum, black gum, tupelo, bay, magnolia, maple, and the other softer hardwoods. Cypress is also included with the pulping hardwoods. The nonpulping hardwoods include oak, hickory, beech, ash, elm, etc.

Table 4. -- Net cordwood volume of pulping and nonpulping species

Tree species-group	Tree diameter class	Major forest type-groups			Total	Percent of total volume
		Pines	Pine-hardwoods	Hardwoods		
	Inches	----- Thousand cords <u>1/</u> -----				
Pulping species:						
Pines	6 & 8	5,446	1,260	340	7,046	10.6
	10 & 12	8,021	1,779	312	10,112	15.3
	14,16 & 18	7,122	1,702	205	9,029	13.7
	20 +	4,603	1,296	134	6,033	9.1
Total pines		25,192	6,037	991	32,220	48.7
Hardwoods	6 & 8	864	933	1,655	3,452	5.2
	10 & 12	702	1,160	2,079	3,941	5.9
	14,16 & 18	377	1,149	3,344	4,870	7.4
	20 +	86	500	2,216	2,802	4.2
Total pulping hardwoods		2,029	3,742	9,294	15,065	22.7
Total pulping species		27,221	9,779	10,285	47,285	71.4
Nonpulping species:						
Hardwoods <u>2/</u>	6 & 8	1,348	1,255	2,262	4,865	7.3
	10 & 12	842	1,247	2,556	4,645	7.0
	14,16 & 18	468	1,208	3,367	5,043	7.6
	20 +	190	732	3,486	4,408	6.7
Total nonpulping species		2,848	4,442	11,671	18,961	28.6
Total all species		30,069	14,221	21,956	66,246	100.0
Percent of total volume		45.4	21.5	33.1	100.0	

1/ Classifications less than 650,000 cords should be considered as indicating only the comparative magnitude of the item.

2/ Includes volume of sound scrub oak.

The estimate of cordwood volume, classified according to species-groups and diameters of trees, is shown graphically in figure 1.

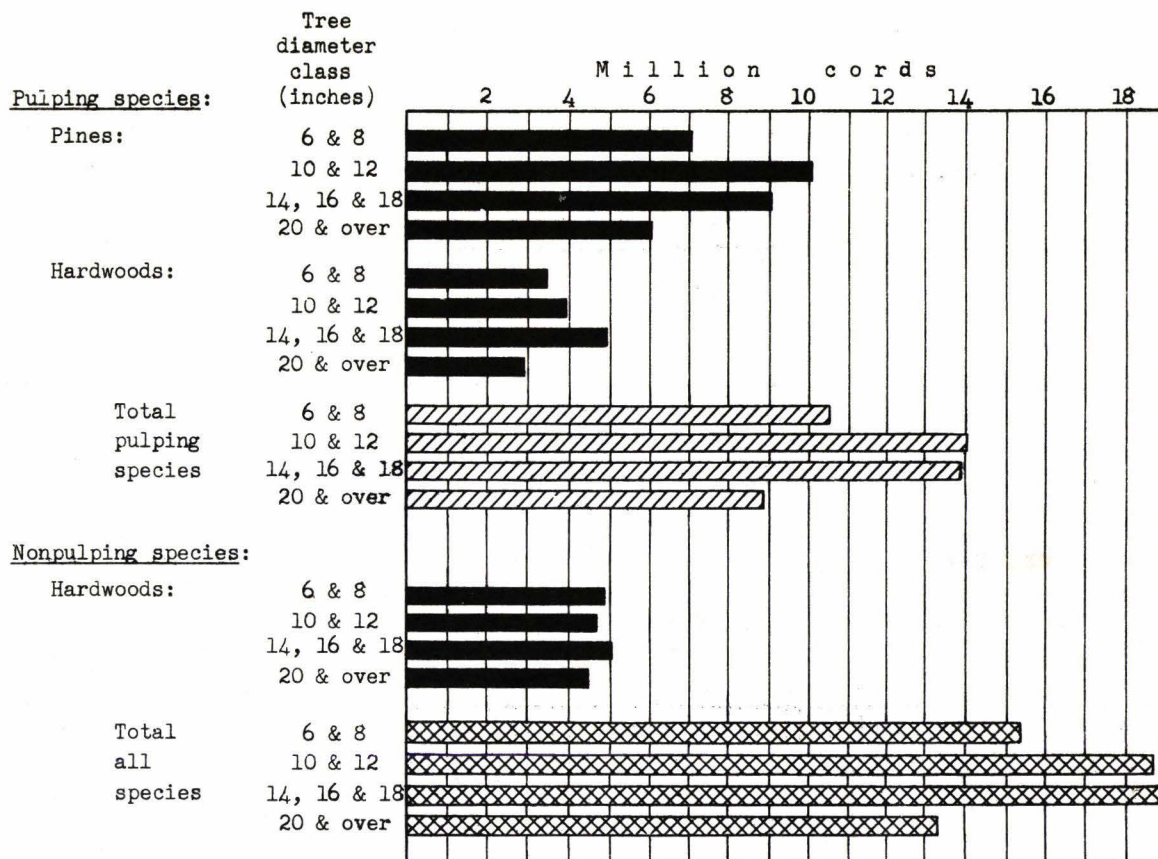


Figure 2. -- Cordwood volume of pulping and nonpulping species

The cordwood volume of pulping and nonpulping species on the average acre of each forest type-group is given in table 5 according to tree-diameter groups. This average-acre volume is a theoretical figure arrived at by dividing the cordwood volume in each type-group by the total acreage of the group. It provides a means of comparing the different type-groups with respect to species composition, diameter distribution, and density. The general average for the unit, including all types, is over 10 cords per forest acre.

From the standpoint of the most profitable returns from the investment, these stands are deficient in the larger size-classes. Gradual improvement in this respect may be brought about by preserving for further growth in sawtimber cuttings, much of the volume in smooth vigorous trees particularly in the 14- to 20-inch diameter-classes. In the smaller diameter-classes, conservative partial cuttings for pulpwood and other cordwood uses can, if properly handled, contribute greatly to future yields of valuable poles, piling, and sawtimber.

Table 5. -- Net cordwood volume of pulping and nonpulping species on the average acre of forest land (excluding clear-cut, reproduction, and fire-killed conditions)

Tree species-group	Diameter group	Major forest type-group		
		Pines	Pine-hardwoods	Hardwoods
	Inches	----- Cords -----		
Pulping species:				
Longleaf pines	6 +	.47	.06	.01
Loblolly and shortleaf pines	6 & 8	2.23	.93	.16
	10 & 12	3.32	1.32	.15
	14,16 & 18	2.93	1.26	.10
	20 +	1.79	.96	.06
Total loblolly and shortleaf pines		10.27	4.47	.47
Total pines		10.74	4.53	.48
Hardwoods	6 & 8	.36	.70	.80
	10 & 12	.30	.86	1.01
	14,16 & 18	.16	.86	1.62
	20 +	.04	.38	1.08
Total pulping hardwoods		.86	2.80	4.51
Total pulping species		11.60	7.33	4.99
Nonpulping species:				
Hardwoods	6 & 8	.56	.94	1.10
	10 & 12	.35	.93	1.24
	14,16 & 18	.19	.91	1.63
	20 +	.08	.55	1.69
Total nonpulping species		1.18	3.33	5.66
Total all species		12.78	10.66	10.65

Forest Industries

During 1934, 661 sawmills located in this unit produced a large proportion of the lumber manufactured in the State of Mississippi. Fourteen of the sawmills had a daily capacity of 40 thousand board feet or more; 65 a capacity of 20 to 39 thousand feet; and 582 were small mills with capacities of less than 20 thousand feet. Other primary wood-products establishments include 9 veneer plants, 13 cooperage plants, and 5 producing dimension stock, handle- and ski-stock, boat oars, shuttle blocks, or excelsior. A large amount of pulpwood is cut in this unit and shipped to the Masonite plant at Laurel, Mississippi, and to the pulpmill at Bogalusa, Louisiana. In addition a large quantity of crossties, poles, piles, and other forest products is produced in the unit.

In the final report of the Forest Survey for this unit, the available data on growth and drain will be carefully weighed to determine the prospects for stabilizing existing wood-using industries and to determine the opportunities for the new industries permissible if the standing-timber investment is maintained in a productive condition.